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Incidence and Management of Polypharmacy

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Independent Study

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Abstract

There is a growing concern related to poly pharmacy in various generations with a special interest in elderly. The geriatric population is at high risk of having various chronic illness and in turn uses multiple medications for their chronic illness. When talking about polypharmacy, what would one expect to see? What are the incidences related to polypharmacy and how can that be managed? Polypharmacy is described as having prescriptions of multiple drugs. Other definitions state polypharmacy as the use of multiple medications. No article seems to define the number of drugs that can be considered as multiple. Other articles have number ranges from five to twenty or more medications. Poly pharmacy is hence addressed as a general use of various medications both over the counter and prescription. The goal of this paper is to make our society aware of the need to review and reconcile patients' medications in order to reduce the negative incidence and management of polypharmacy.

Background

"I woke up this morning feeling shakily and my heart pounding. It felt as though I was going to die and I was scared to call ambulance. I thought I should just come in and see you." This was a statement told to a primary care provider from a geriatric patient during a routine follow up visit. Upon assessment and review of the patient's medications, the provider noted that the patient had been taking the wrong time and amount of his Flomax. He was taking at least seven medications and most of them were to be taken two to three times a day. He had understood that he should take the capsule three times a day. On his medication list he had omeprazole and Flomax that were both capsules. According to his previous visit, his understanding was to take the capsules three times a day and since he picked both bottle after that visit he was not able to differentiate the two and took the Flomax versus the omeprazole three times a day.

Another example was a 78-year-old female leaving independently in an assisted living managing her medications independently with at least six comorbidities including but not limited to diabetes, chronic kidney failure, and hypertension. She had been hospitalized four times within the past month with hypoglycemia episodes. Prior to all her admissions she had been managing her diabetes with metformin and maintained blood glucose levels with 100 – 250 mg/dl. Her hemoglobin A1C was 7.5. Upon further assessment the provider noted that she had been taking her short-acting insulin three times a day and her blood glucose was very low during the night. She was taking her last snack at 7pm and going to bed per her previous routine. She had maintained using the short-acting per teaching that she had received at the hospital three times a day, not considering the carbohydrates she was taking. Review of her hospital records indicate that she was eating at least six carbohydrates with every meal while at the hospital. Her

metformin had been discontinued and she was to start on both short- and long-acting insulin. Her blood glucose was managed well due to a structured setting and her meals being monitored. While at the assisted living she was making her own choices on the meal she was taking. She was still taking metformin per her old records and added the insulin to her list. That played a huge impact on her blood glucose since she had been scheduled to take six units of Novolog three times a day and taking metformin twice day. This caused the frequent hypoglycemic episodes because most days she was taking at least three or less carbohydrates, then snacking in between per her old routine.

Polypharmacy may have indications as above due to poor understanding of one's medication management. The need for providers to take time and review patients' medications may be relevant in reducing incidence and managing polypharmacy. Ferner & Aronson (2006) state that in an ideal situation prescribing information should have the potential side effects of every drug, whereby one should be able to know probability of harm in relation to the dose, time and factors that alter one's susceptibility. Communicating therefore can enable patients' awareness on what kinds of medications they are taking and a better understanding of potential side effects.

Research has shown that the incidence of polypharmacy occurs more with older adults especially in the geriatric populations who have a higher rate of chronic comorbidities. This increases their chance of having multiple prescriptions for various disease processes. Steinman, Lund, Miao, Boscardin, & Kaboli, (2011) completed a study that showed the adverse drug effects to geriatric patients, and how drug interactions increased functional impairments such as falls, and cognitive status. This study also showed the probability of adverse drug interactions hinder the older adults or geriatrics from functioning at an optimal level. For instance using

antihypertensive can increase risks of orthostatic blood pressure when patients have impaired vascular tone, they are unable to compensate the physiological changes caused by the medications. This would then increase the rate of falls in this population and may lead to another comorbidity like fracture or limited mobility due to pain.

Managing polypharmacy may be difficult when patients have or use various providers that need to be in direct communication with all changes on medication prescription. This can be an issue with patients that utilize specialty services on multiple concerns. An example is a patient that has an oncologist, hematologist, cardiology, and a primary care provider. If a clear line of treatment is not indicated, the patient would receive medications or procedures that can be repeated in another clinic. Steinman, Lund, Miao, Boscardin, & Kaboli, (2011) explains that ongoing review of drug interactions is necessary; stating that adverse drug reactions can be noted at early stages of initiating a new medication. Therefore caution is needed when starting new medications, with a recommendation of initiating one drug at a time or discontinuing one drug at time. It would also benefit patients to have a follow up visit with their primary care providers less than seven days after discharge to review their recent admission and current plan being maintained after discharge.

Case Report

Chief Complaint: 87 year old female at the clinic for a follow up visit after a recent admission with urinary tract infection and fatigue for 3 days. She is also feeling dizzy.

HPI:

Ms. E.M is at the clinic today for a follow up visit after a recent discharge. She reports feeling much better and denies having dysuria, frequency, urgency or lower back pain. She reports that

she has been taking her antibiotic and has at least 3 doses left to finish her dosage. She denies having a fever or chills and denies pain. She is c/o of dizziness and fatigue that is ongoing, she states that the dizziness is more in the morning when she awaken or move from a sitting to standing. She denies having vertigo and states that the dizziness resolves when she takes time or rests in between moving positions. Other than her current medications she is not taking any medications to control her current symptoms of feeling dizzy and fatigue.

PMH:

Dementia

Diabetes

COPD

Anemia

Hypertensive

Depression

Neuropathy

Medications:

Donepezil 5 mg po daily

Fluticasone proprionate and salmeterol 250/50 1 puff bid

Losartan 50 mg po daily

Metoprolol 50 mg po daily

Gabapentin 300 mg tid

Paroxetine 20 mg po daily

Quetiapine 200 mg po bid

Insulin glargine 30 units' SQ qhs

Nitrofurantoin ER 100 mg po bid X 7 days (3 days left)

Multivitamin po daily

Iron sulfate 325 mg po bid

Allergies: NKA

Social history:

She does not smoke, no alcohol use or illicit drug use.

Personal and family history:

She resides in an assisted living facility; has a daughter; medications are managed at the assisted living

REVIEW OF SYSTEM:

Constitution: she denies having fever or chills

HEENT: denies having headache, c/o of dizziness; denies having trouble hearing or with her eye sight and uses glasses. Denies having nasal drainage or sinus concerns. Denies having dysphagia

Cardiovascular: denies having edema

Respiratory: denies having SOB or dyspnea;

GI: denies having abdominal pain

GU: denies dysuria or frequency; denies nausea or emesis; denies constipation

Musculoskeletal: states that she is independent at the assisted living

Physical Examination:

V/S: BP 88/40; P 50; R 24; T 98.6

FSBS this morning 107

Constitution: she is alert and oriented x 3; does not appear to be in any acute distress; groomed appropriately for the season

HEENT: head – atraumatic; eyes – wears glasses; ear – symmetrical with no visible deformity; nose- no drainage and nares are patent, denies sinus pressure; throat – able to swallow, thyroid midline.

Cardiovascular: Normal S1 and S2; no edema

Respiratory: Lung sounds are clear with no distress, no wheezing or rales

GI: abdomen is soft and non-tender; positive bowel sounds

GU: CVS negative; denies dysuria or frequency; denies nausea or emesis; denies constipation

Musculoskeletal: observed to be ambulatory

Assessment & Plan

Differential Diagnosis: Drug interaction; Hypotension; Anemia; Bradycardia;

Drug Interaction – currently on various medication with probability of drug interaction. No clinical indication for some of the medications.

Plan – will review and discontinue one medication at a time with follow up as needed and review with pharmacist on contraindications. Initial medication to be discontinued will be Quetiapine/Seroquel on the next visit.

Hypotension – Blood pressure 88/40 with complaints of dizziness; on metoprolol 50 mg daily with side effects causing dizziness and fatigue.

Plan – Will reduce metoprolol to 25 mg po daily and continue to monitor blood pressure daily, with nurse visit and report blood pressures lower than 80/40, c/o of dizziness, lightheadedness, fatigue, diarrhea, confusion.

Anemia – Currently on iron and multivitamin supplements, has complaints of fatigue that has been ongoing experience. CBC - WNL; Iron studies – WNL; ferritin - WNL

Plan – will continue with current treatment plan of iron supplements and reassess on fatigue within 1 week.

A Review of Literature

A literature review was completed in order to assess the incidence, causes, and management of polypharmacy. The research was done using databases such as PubMed, CINAHL, Medline, and Cochrane. The keywords included "Polypharmacy in geriatric", "Incidence in polypharmacy", and Management of polypharmacy". Numerous articles that were peer reviewed and had the word "Polypharmacy", were further evaluated for this paper. They were then narrowed down using the articles summaries or conclusion to help determine their association with the current topic. Articles that addressed using the keywords "incidences and management of polypharmacy" were selected and also further reviewed. A total of sixteen articles were considered relevant and related well with the topic. Those articles reviewed prevalence and negative effects of polypharmacy, and interventions that could help manage polypharmacy. Some articles indicated common adverse and drug interactions related to polypharmacy. A further review of the articles was done to selectively use articles with most literature on incidence, causes and management of polypharmacy, which narrowed the articles down to ten.

Incidence and Causes of Polypharmacy

Sganga, et. al. (2015) reports that polypharmacy is related to hospitalization of older adults and complex disease processes. Reports in the article explain that the use of polypharmacy

has an increased the rate of adverse reactions. These adverse reactions may lead to hospitalization. The article states that patients taking at least seven drugs or more have a higher chance of medication error. Explaining that older adults that have many drugs, at times lack a good medication management like a pill box and could forget the drugs that they took increasing a chance of error or doubling the doses.

Marcum, Thorpe, Gellad, & Donohue, (2014) explain that using numerous pharmacies versus one/similar pharmacy may increase the likelihood of polypharmacy. The authors also indicate that multi pharmacy was associated with higher medication non adherence, poor communication with providers, patients and pharmacists. The article explains that when considering work loads of pharmacists, chances of overrides, lack of a complete medication history and the multi pharmacy use can also cause incidents such as use of warfarin and anti-inflammatories leading to gastrointestinal bleeding. Communication therefore plays an important role in reducing the incidences of polypharmacy. Field, Gurwitz, Avorn, et. al (2001), the study was completed on long term care patients that had multiple drugs. The study showed that a number of the patients had an adverse drug effect at some point in the study that was either life threatening, serious or fatal. The study concluded that adverse drug effects were preventable, recommending reducing the number of drugs that were being taken, reviewing indications of use more often and reducing prescription. Reviewing drugs can be done with a multisystem approach by using various team members like medical assistants, clinic nurses, providers, pharmacies among other providers that have the knowledge and understanding of being able to check which medications patients are taking.

Fried, et. al. (2014), show that polypharmacy was a marker for poor health since most people that take multiple medications had a number of co-morbidities. The study expected to

show that polypharmacy was related to fall risks, adverse drug reactions events, hospitalization, mortality, physical and cognitive impairment. However, the results indicated an independent relationship between polypharmacy and outcomes for example medications and mortality in older adults found no mortality benefit.

Management of Polypharmacy

Spinewine, et. al. (2007) explains that since the geriatric population has a wide heterogeneity with health conditions ranging from fit to frail, it is not appropriate to generalize their cares or prescribing decisions. They further elaborate that medications being a fundamental part of their care, providers should use good measures to prescribe medications that are beneficial to these age groups. The article uses three values to judge for appropriateness which include, what the patient wants, scientific or technical rationalism which includes the clinical pharmacology of the drug and the general good. When understanding "what the patient wants", provider should listen to patients' and know what they are experiencing. A cent example is a patient that came to the clinic with concerns on occasional numbness to their bilateral wrists and were worried that they could be having a stroke due to their family history. Upon assessment and review of their system, there were no red flags indicating a stroke. On examination the patient then stated that they have noticed the numbness when sleeping with their hand under the head. Often it has been a habit they have developed due to a recent shift change. On days that they have a day off and nap in their bed, the complaint has not been evident. Most differential diagnosis were negative and the conclusion was that they must be pinching their nerves when sleep laying their head on their hands. A change of that habit and follow up within 2 weeks resolved the concern. O medications were needed in this case and so many other cases that one may come across in the field. At times patients' feel better talking with their providers for

assurance versus medication initiation. Various studies indicate that using geriatric medicine service approaches, having pharmacist involvement in reviewing contraindications, patient care and computerized decision support can improve the appropriateness of prescribing in geriatrics.

Sganga, et. al. (2015) explains that using a pill box can help manage medications and organize the times those medications are taken thereby reducing drug interactions or over dose related to doubling the doses. Ferner & Aronson, (2006) states that an understanding of prescription medications by providers and patients can help manage polypharmacy and may reduce drug incidences. An example is knowing the common side effects of medications and being able to identify the changes like an increased level of prothrombin time in a patient taking Coumadin may be related to a drug interaction with a new drug or change. The article concluded that more research and resources are needed to support providers with appropriate information to help both providers and patients make informed decisions when prescribing and taking medications. Marcum, Thorpe, Gellad, & Donohue, (2014) states that pharmacies can manage and may reduce polypharmacy by using the pharmacy software which can randomly checks for possible alerts that hence prevent drug interactions from occurring.

Tan, Eastment, Poudel, & Hubbard, (2015) also reaffirms the importance of providers informing their patients and ensuring that they understanding which medications they have been prescribed, the risks and benefits of the drug, and their goal of care. When patients are informed, they can make informed decision to take the medications and hopefully update their providers when they suspect that they are experiencing side effects. Patients can be able to identify which medication they recently changed and clue in the providers to take a closer approach on addressing the concern versus treating a side effect of a medication that could probably be discontinued and resolve the problem. The center for disease control and prevention (2010)

explains in an article that the use of new medications can be used to improve one's quality of life. However, the article also states that inappropriate prescription can be detrimental to one's health thereby as earlier shown in this paper an understanding of medication use should be well known before prescribing the medications. Providers and patients need to be aware of which medications they are taking, taking initiatives like reading the paper work provided to patients' by the pharmacist or having a consult at the pharmacy for all new medications that they are receiving.

World health organization (2012) concludes with 12 interventions that are relevant toward managing polypharmacy " establishing of a multidisciplinary national body to coordinate policies on medicine use; use of clinical guidelines; development and use of national essential medicines list; establishment of drug and therapeutic committees in districts and hospitals; inclusion of problem-based pharmacotherapy training in undergraduate curricula; continuing in-service medical education as a licensure requirement; supervision, audit and feedback; use of independent information on medicines; public education about medicines; avoidance of perverse financial incentives; use of appropriate and enforced regulation; sufficient government expenditure to ensure availability of medicines and staff". The above steps if implemented throughout the health systems, incidence and management of polypharmacy can be attained.

Learning Points

- Communication is a key to managing polypharmacy, when patients and providers are informed of the potential risks versus the benefits, they will more than likely use available resources to reduce harm. For instance patients can quickly and easily identify changes which need to be reported to their providers. Providers

would also have screening in place to prevent harm like having routine blood count on patients taking clozapine. With open communication harm can be detected early and interventions placed to maintain safety.

- Collaboration with other team members. When patients are seen with providers, a quick review of the patients' medications would be relevant. Using resources available at various clinics and hospitals like the use of pharmacists to evaluate the clinical need of the medications they are taking and address possible contraindications. Having clinic nurses' complete follow up calls to at risk patients that start new medications to confirm their understanding.
- Educating patients of expected and unexpected actions on their current medications. An example providing essential tools like automated blood pressure cuffs and having patients keep records of their reading. Ensuring that patients' that are diabetic bring their glucose meters to their primary care provider appointments for a closer look into their blood glucose readings. Reviewing the levels with the patients and providing teaching on events that seem unclear or reinforcing better control of the levels.
- Being advocates for patients and addressing concerns that are recognized at the clinic or hospital with appropriate interventions. For instance when a provider sees a patient that is elderly and is at risk of polypharmacy related to poor management of her medications. Providers should initiate an in home assessment for medication management if covered by insurance. Providers can also have house calls paramedics that visit people at home to help manage their medications and reduce incidences that can be caused with poor medication management.

- Self-efficacy in patients can also attribute to managing polypharmacy. This can be achieved by patients having the motivation to make it when circumstances change and not rely on medications to help sort out their problems. Having the ability to recognize that not all disease processes are treated with antibiotics or pain medications, being able to pursue non pharmacological interventions like physical therapy to manage pain.

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